



## STRESS PREDICTION SYSTEM

In the early 1970s, NASA contracted with the University of Michigan's Center for Ergonomics for development of a computerized biomechanical model capable of predicting stresses on various parts of the human body. Planning for possible advanced lunar missions and space station extravehicular activity, NASA wanted to know how astronauts' bodies would react under various gravitational pulls and space suit weights.

The Center for Ergonomics successfully developed an algorithm, or mathematical formula, for determining what type of stress and what degree of load a body could stand, taking into consideration the body's height, weight and posture. That technology has been commercialized with the ISTU™ (Isometric Strength Testing Unit) Functional Capacity Evaluation system (**right**), manufactured by Ergometrics, Inc., Ann Arbor, Michigan.

The hand grips the subject is pressing measure the lift/push/pull force being applied. The horizontal bar slides upward and downward from overhead level to foot level; varying the bar level and the body position enables testing the lift capacity of a subject. Tasks such as lifting a heavy box from

floor level, or lifting a weight overhead, or pulling/pushing a cart can be simulated. A computer printout provides the subject's test score and the exertion expended, and identifies the muscle group (knee, hip, ankle, etc.) that limits the subject's performance on a particular task.

Biomechanical strength modeling compares the physical stresses generated in the

shows how much an injured worker is capable of lifting, an aid to disability rating, return-to-work targeting or detection of malingering. It is also useful for preemployment examinations, identifying candidates capable of meeting predetermined physical requirements; this helps reduce the number of future injuries and therefore reduces workers' compensa-



body with the resultant force capabilities of industrial workers; it translates job stresses into terms of human ability to handle them, and is therefore an effective tool of personnel evaluation, personnel selection and job redesign.

The isometric strength test is useful in disability evaluation; for example, it

tion claims. The system also has utility in redesigning unsafe jobs and in rehabilitation programs; strength measurement at the start of a therapy program and at intervals thereafter allows the therapist to determine if there has been actual improvement.

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